

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

CE 642 Traffic Flow Theory and Control

College: Engineering

Department: Civil

First: Course Definition

1- Course Code : CE 642

2- Units : 3

3 – Semester

4 -Prerequisite

5- Co-requisite

6- Location (if not on main Campus):

Second: Course Objectives

- 1- Apply Fundamentals of macro and microscopic traffic flow characteristics, continuum flow models.
- 2- Control of signalized and unsignalized intersections, and traffic simulation

Third: Course Specifications

1- Topics to be covered

Subject	No of Weeks	Units
Traffic Flow Theories : Macroscopic Traffic Flow Theory	1	3
Traffic Flow Theories : Microscopic Traffic Flow Theory	1	3
Queueing and Delays at Isolated Intersections: Traffic Characteristics, The Gap Acceptance Function, The Delay To A Single Car, Delays To Pedestrians, Queueing And Delays Of Vehicles, The Delay At A Traffic Signal	3	9
Traffic Control : Objectives Of Traffic Control, Single, Isolated Intersection, Synchronization Schemes For Arterial Traffic, The TRANSYT Program	3	9

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
--	--	--

<p>Traffic Control : Traffic Responsive Operation Of Traffic Lights, Single Intersection, Systems of Intersections, The SCOOT Program, The OPAC, PRODN, CRONOS, and COP Programs, The Onset of Oversaturation, Oversaturated Systems, Freeway Control, Systems Affected By Geometric Details</p>	3	9
<p>Traffic Generation, Distribution, and Assignment: Network Representation Of A Transportation System, Trip Generation And Distribution, Time-Independent Traffic Assignment, Dynamic Traffic Assignment, Traffic Assignment In Congested Systems</p>	3	9

2- Course components (Total hrs in the Semester): 42

Lecture	Exercise	Other
42	-	0

3- Intended Learning Outcomes of the Course (ILO's)

a. Knowledge

i) Description of the knowledge to be acquired:

- Macroscopic and Microscopic Traffic Flow Theory
- Queueing and Delays at Isolated Intersections
- Traffic Control
- Traffic Generation, Distribution, and Assignment
- Traffic simulation using **TRANSYT program**
-

ii) Teaching strategies to be used to develop that knowledge

- Class lectures.
- Term projects.
- Students' presentations.
- Group discussion.

iii) Methods of assessment of knowledge acquired

- Exams.
- Quizzes.
- Homework assignments.
- Term projects.

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

b- Cognitive (Intellectual) Skills

i) Cognitive skills to be developed

- Advanced concept of traffic flow theory and control
- TRANSYT Program

ii) Teaching strategies to be used to develop these cognitive skills

- Class lectures.
- Case studies analysis.
- Term projects.

iii) Methods of assessment of students cognitive skills

- Students' seminars and presentations.
- Term projects.
- Written reports.

c. Interpersonal Skills and Responsibility

i) Description of the interpersonal skills and capacity to carry responsibility to be developed

- Decision making based on engineering analysis.
- Communication skills.
- Team work.

ii) Teaching strategies to be used to develop these skills

- Class lectures.
- Term projects.
- Case studies analysis.

iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility

- Term project.
- Written reports.
- Students' seminars and presentations.

d. Communication, Information Technology and Numerical Skills

i) Description of the skills to be developed in this domain

- Literature research.
- Problems modeling.

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

- Utilization of computer applications in analysis and modeling.

- ii) Teaching strategies to be used to develop these skills**
- Class lectures.
 - Case studies analysis.
 - Computer lab sessions.
 - Term projects.
- iii) Methods of assessment of students numerical and communication skills**
- Term projects.
 - Written reports.
 - Students' seminars and presentations.

e. Psychomotor (if applicable) & Other Non-cognitive Skills

i) Description of the psychomotor or other skills to be developed and the level of performance required

- NA

ii) Teaching strategies to be used to develop these skills-

- NA

-

iii) Methods of assessment of student's psychomotor skills

- NA

4- Student Assessment Schedule

Serial	Assessment tool (test, group project, examination etc.)	Week due	Weight
1	Term Project – 1	3 rd	15 %
2	Mid Term Exam -1	7 th	15 %
3	Term Project – 2	10 th	15 %
4	Term Project – 3	13 th	15 %
5	Final Exam	16 th	40 %

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	---

5- Student Support

- Providing electronic library of textbooks and scientific periodicals.
- Providing the necessary computer applications for the course.

6- Learning Resources

i) Essential Books (References)

- Kerner, B. S. " Introduction to Modern Traffic Flow Theory and Control: The Long Road to Three-Phase Traffic Theory," Nova Science Pub Inc; 2010. ISBN-10: 3642026044, ISBN-13: 978-3642026041
- Drew, D. R. "Traffic Flow Theory and Control," McGraw Hill Text; 1968. ISBN-10: 0070178313, ISBN-13: 978-0070178311

ii) Course Notes

- NA
-

iii) Recommended Books

iv) Electronic Books & Web Sites:

- Scientific journals and forums.
- <http://www.trl.co.uk/Transyt.htm>
-

v) Periodicals

- ASCE scientific journals.
- ScienceDirect journal.

7- Course Evaluation and Improvement Processes

i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Students' questioners.
- Students' evaluation of course and instructor.

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
---	--	--

ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Public faculty seminars.
- Assessment by external evaluators of students achievements
- Instructor (Course) Report

iii) Processes for Improvement of Teaching

- Assessment of students' work by external examiners.
- Analysis of students' evaluation of course and instructor.
- Seminars by industry professionals.

iv) Processes for verifying standards of student achievement (e.g. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- Check marking by an independent faculty member of a sample of student work.
- Periodic exchange and remarking of a sample of assignments/exams with a external evaluator.

v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.